

#4

SEQUENCE LISTING

<110> MORAN, MAGDALENE M.  
CHONG, JAYHONG A.  
RAMSEY, IAN SCOTT  
CLAPHAM, DAVID E.

<120> SPERM-SPECIFIC CATION CHANNEL, CATSPER-4, AND USES THEREOF

<130> 110313.139US2

<140> 10/523,475

<141> 2005-02-04

<150> PCT/US03/024359

<151> 2003-08-04

<150> 60/402,115

<151> 2002-08-07

<160> 7

<170> PatentIn Ver. 3.3

<210> 1

<211> 1197

<212> DNA

<213> Homo sapiens

<400> 1

atgtctcaac	accgtcacca	gcgccactcg	agagtcattt	ctagttcacc	agttgacact	60
acatcggttg	gattttgccc	aacattcaag	aaatttaaga	ggaacgatga	tgaatgtcgg	120
gcatttgatg	agagagtcac	aatgagccgt	ttctttaaga	taattatgat	tagcactgtc	180
acatcgaatg	cgttttttat	ggccttggtg	accagttatg	acataaggta	ccgcttggtc	240
agacttcctg	agttctcgga	gatcttcttt	gtgtccatct	gcacatctga	gttgccatg	300
aaggctctatg	tggaccccat	caactactgg	aagaacggct	acaacctgct	ggatgtgatc	360
attatcatcg	ttatgttttt	accctatgcc	ctccgccagc	tcatgggcaa	acagttcact	420
tacctgtata	tcgctgatgg	catgcagtc	ctgcgcaccc	tcaagcttat	cggctatagc	480
cagggcatcc	ggacgctgat	caccgccgtg	gggcagacag	tctacaccgt	ggcctctgtg	540
ctcctcctgc	tcttcctcct	catgtacatc	ttcgctatct	tgggcttctg	cctgtttgga	600
tctccagaca	atggtgacca	tgataactgg	gggaacctgg	ctgcagcttt	tttcaccctc	660
ttcagcttg	ccacggttga	tggctggaca	gacctgcaga	agcagttgga	caatcgggaa	720
tttgctttga	gccgggcatt	caccatcatc	ttcatcttgc	tcgcctcttt	catcttcctc	780
aacatgttcg	tgggtgtgat	gatcatgcac	acagaggact	ccatcagaaa	gtttgagcga	840
gagctgatgt	tggagcagca	ggagatgctc	atgggagaga	agcaggtgat	tctgcagcgg	900
cagcaggagg	agatcagcag	gctgatgcac	atacagaaaa	atgctgactg	cacaagtttc	960
agtgagctgg	tggagaactt	taagaagacc	ttgagccaca	ctgacccaat	ggctctggat	1020
gattttggca	ctagcttacc	cttcacatgat	atctactttt	ccactctgga	ctaccaggac	1080
acaactgtcc	acaagcttca	agagctgtac	tatgagatcg	tgcattgtgct	gagcctaata	1140
ctggaagact	tgccccagga	gaagccccag	tccttgga	aggtggatga	gaagtag	1197

<210> 2

<211> 398

<212> PRT

<213> Homo sapiens

&lt;400&gt; 2

Met Ser Gln His Arg His Gln Arg His Ser Arg Val Ile Ser Ser Ser  
 1 5 10 15  
 Pro Val Asp Thr Thr Ser Val Gly Phe Cys Pro Thr Phe Lys Lys Phe  
 20 25 30  
 Lys Arg Asn Asp Asp Glu Cys Arg Ala Phe Val Lys Arg Val Ile Met  
 35 40 45  
 Ser Arg Phe Phe Lys Ile Ile Met Ile Ser Thr Val Thr Ser Asn Ala  
 50 55 60  
 Phe Phe Met Ala Leu Trp Thr Ser Tyr Asp Ile Arg Tyr Arg Leu Phe  
 65 70 75 80  
 Arg Leu Leu Glu Phe Ser Glu Ile Phe Phe Val Ser Ile Cys Thr Ser  
 85 90 95  
 Glu Leu Ser Met Lys Val Tyr Val Asp Pro Ile Asn Tyr Trp Lys Asn  
 100 105 110  
 Gly Tyr Asn Leu Leu Asp Val Ile Ile Ile Ile Val Met Phe Leu Pro  
 115 120 125  
 Tyr Ala Leu Arg Gln Leu Met Gly Lys Gln Phe Thr Tyr Leu Tyr Ile  
 130 135 140  
 Ala Asp Gly Met Gln Ser Leu Arg Ile Leu Lys Leu Ile Gly Tyr Ser  
 145 150 155 160  
 Gln Gly Ile Arg Thr Leu Ile Thr Ala Val Gly Gln Thr Val Tyr Thr  
 165 170 175  
 Val Ala Ser Val Leu Leu Leu Leu Phe Leu Leu Met Tyr Ile Phe Ala  
 180 185 190  
 Ile Leu Gly Phe Cys Leu Phe Gly Ser Pro Asp Asn Gly Asp His Asp  
 195 200 205  
 Asn Trp Gly Asn Leu Ala Ala Ala Phe Phe Thr Leu Phe Ser Leu Ala  
 210 215 220  
 Thr Val Asp Gly Trp Thr Asp Leu Gln Lys Gln Leu Asp Asn Arg Glu  
 225 230 235 240  
 Phe Ala Leu Ser Arg Ala Phe Thr Ile Ile Phe Ile Leu Leu Ala Ser  
 245 250 255  
 Phe Ile Phe Leu Asn Met Phe Val Gly Val Met Ile Met His Thr Glu  
 260 265 270  
 Asp Ser Ile Arg Lys Phe Glu Arg Glu Leu Met Leu Glu Gln Gln Glu  
 275 280 285  
 Met Leu Met Gly Glu Lys Gln Val Ile Leu Gln Arg Gln Gln Glu Glu  
 290 295 300

Ile Ser Arg Leu Met His Ile Gln Lys Asn Ala Asp Cys Thr Ser Phe  
305 310 315 320

Ser Glu Leu Val Glu Asn Phe Lys Lys Thr Leu Ser His Thr Asp Pro  
325 330 335

Met Val Leu Asp Asp Phe Gly Thr Ser Leu Pro Phe Ile Asp Ile Tyr  
340 345 350

Phe Ser Thr Leu Asp Tyr Gln Asp Thr Thr Val His Lys Leu Gln Glu  
355 360 365

Leu Tyr Tyr Glu Ile Val His Val Leu Ser Leu Met Leu Glu Asp Leu  
370 375 380

Pro Gln Glu Lys Pro Gln Ser Leu Glu Lys Val Asp Glu Lys  
385 390 395

<210> 3

<211> 1188

<212> DNA

<213> Mus musculus

<400> 3

```

atgtcccaac attttcacca caaccctgta cgagtcaagt cgggctcact gtttgctaca 60
gcatcggaag cattgcaggc aagactgagc aagattaaga ggaaggataa ggagtgccag 120
gcttacttca ggaaggttat taagagcact ttcttccaga ttgtgatgat caccacggtc 180
accaccaact cttttttact ggtcttgggg actaattatg acatacaatt cgagtttttc 240
agaacctttg aggtctcaga gcttttcttt gtatctgtct atgtctgcga gttcctcatg 300
aaggtctatg tggaccccat tacatactgg aaggatggct ataacatact ggatgtgatc 360
attctcatca ttctcaccat accctatctc ctccgcaaaa tcaaggggaa tcattctgca 420
tacctccact ttgctgatgg catccagtct ctacgaatcc tcaagcttat ctccacagt 480
aggggcatca ggacactcat catcgctgtg ggggagacgg tctacactgt ggctcggtg 540
ctgacgctgc tcttctctct catgtttgtg ttcgcatcc tgggattctg cctatttggc 600
gtgacggaca gaggcgacct ggagaactgg gggaacctgg cttcagcttt ctttactctc 660
ttcagtttgg ccacggttga tggctggact gacctgcagg aagagctgga caagaggaag 720
tttactgtga gccgggctgt tactatcctc ttcatcttgc ttgcatcctt catcttctc 780
aacatgtttg tgggtgtgat gatcatgcac acggaggatt ccatgaaaaa gtttgagcgg 840
gatctgacgt tggagaggaa ccttgcgatt atggaggaga agcaaataat cctgaaacgc 900
cagcaagagg aggtcaacag gctgatgaac acacagaaaa ctggtagcat gaacttcatt 960
gatatggtgg agggcttcaa gaagaccctg cggcacacag accccatggt tctggatgac 1020
ttcagcacta gtctctcctt cattgatatc tacttgggtc cactggacaa ccaagatgtt 1080
attgtcagca agcttcagga gctctactgt gagattgtga acgtgctgag cctgatgttg 1140
gaagacatgc ccaaggagag ctctgccagc ctctcgggac taagttaa 1188

```

<210> 4

<211> 395

<212> PRT

<213> Mus musculus

<400> 4

Met Ser Gln His Phe His His Asn Pro Val Arg Val Lys Ser Gly Ser  
1 5 10 15

Leu Phe Ala Thr Ala Ser Glu Ala Leu Gln Ala Arg Leu Ser Lys Ile  
20 25 30

Lys Arg Lys Asp Lys Glu Cys Gln Ala Tyr Phe Arg Lys Val Ile Lys  
 35 40 45  
 Ser Thr Phe Phe Gln Ile Val Met Ile Thr Thr Val Thr Thr Asn Ser  
 50 55 60  
 Phe Leu Leu Val Leu Gly Thr Asn Tyr Asp Ile Gln Phe Glu Phe Phe  
 65 70 75 80  
 Arg Thr Phe Glu Phe Val Ser Glu Leu Phe Phe Val Ser Val Tyr Val  
 85 90 95  
 Cys Glu Leu Met Lys Val Tyr Val Asp Pro Ile Thr Tyr Trp Lys Asp  
 100 105 110  
 Gly Tyr Asn Ile Leu Asp Val Ile Ile Leu Ile Ile Leu Thr Ile Pro  
 115 120 125  
 Tyr Leu Leu Arg Lys Ile Lys Gly Asn His Ser Ala Tyr Leu His Phe  
 130 135 140  
 Ala Asp Gly Ile Gln Ser Leu Arg Ile Leu Lys Leu Ile Ser Tyr Ser  
 145 150 155 160  
 Arg Gly Ile Arg Thr Leu Ile Ile Ala Val Gly Glu Thr Val Tyr Thr  
 165 170 175  
 Val Ala Ser Val Leu Thr Leu Leu Phe Leu Leu Met Phe Val Phe Ala  
 180 185 190  
 Ile Leu Gly Phe Cys Leu Phe Gly Val Thr Asp Arg Gly Asp Leu Glu  
 195 200 205  
 Asn Trp Gly Asn Leu Ala Ser Ala Phe Phe Thr Leu Phe Ser Leu Ala  
 210 215 220  
 Thr Val Asp Gly Trp Thr Asp Leu Gln Glu Glu Leu Asp Lys Arg Lys  
 225 230 235 240  
 Phe Thr Val Ser Arg Ala Phe Thr Ile Leu Phe Ile Leu Leu Ala Ser  
 245 250 255  
 Phe Ile Phe Leu Asn Met Phe Val Gly Val Met Ile Met His Thr Glu  
 260 265 270  
 Asp Ser Met Lys Lys Phe Glu Arg Asp Leu Thr Leu Glu Arg Asn Leu  
 275 280 285  
 Ala Ile Met Glu Glu Lys Gln Ile Ile Leu Lys Arg Gln Gln Glu Glu  
 290 295 300  
 Val Asn Arg Leu Met Asn Thr Gln Lys Thr Gly Ser Met Asn Phe Ile  
 305 310 315 320  
 Asp Met Val Glu Gly Phe Lys Lys Thr Leu Arg His Thr Asp Pro Met  
 325 330 335

Val Leu Asp Asp Phe Ser Thr Ser Leu Ser Phe Ile Asp Ile Tyr Leu  
340 345 350

Val Thr Leu Asp Asn Gln Asp Val Ile Val Ser Lys Leu Gln Glu Leu  
355 360 365

Tyr Cys Glu Ile Val Asn Val Leu Ser Leu Met Leu Glu Asp Met Pro  
370 375 380

Lys Glu Ser Ser Ser Ser Leu Ser Gly Leu Ser  
385 390 395

<210> 5

<211> 6358

<212> DNA

<213> Homo sapiens

<400> 5

```
acaggcatga gccaccgcgc ttggccagaa gtggcattct taaattcaag aaattgggat 60
ggggagtatt cacacatttt ataaccaga aattcaagca attctggtga ctacaaatgc 120
attgttttgg agaatagttg taagggtgaa aaagaattag gaactcgaca gatagtgagt 180
tttaacttta aataacaatt ctctctttgt tttgttttgt ttgagacggg gtctcgctct 240
gctgcccagg ctggagtgca gtggcaggat cacggtttat tgcagcctta acctcctggg 300
ctcaagcagt tctccctcct cagcctccag agtagctggg actataggca agtgccacca 360
cgcctgacta atttttaaat tttttgtaga gatgggtctt cccatcttgc ccaggctggc 420
cttgaactct tgggctcaag caagcctccc acctctgcct cccaaagtcc aaggattaca 480
ggtgtgagcc attgccccca gccagtataa cagtttgtgt gtgtgtgtgt gtgtgtgtgt 540
gtgtgtgtgt gtttgacacg gggctctcatt ctgttgccca ggcagtagtg tagtgggtgcg 600
acctgggtct actgtagtct tgactctctc ggctcaagtg atcctctcac ctgagcctcc 660
tgagtagcag cgggttacag catgcatcac cacacctggc ttatttttaa aacttttttg 720
tgagacaggg gtcttactat gttgccatgg ctgggtctaga acttctgggc tcgagtaatc 780
ctcctgcctt ggcctctcaa aatgttgagg ttacaggtgt gagccactgt gtcataacaa 840
ttatttttaa atttttatct atttttttt aataattata caagatggag tctcactatg 900
ttgccagggc tggctcttgaa tgcctgggct caaatgatct tcttgccttg acccccaaaa 960
gtgctgggat tacaggcgtg agccactgcg cctggcctat aacaattctt atgaagctaa 1020
agttgatttg gatttttagt gccgttacta cttatataat taattagatt aaacaagtc 1080
caaaaatttg atgagctatc ttgggtgtgt ttctttactt ttctctttca acagagagtt 1140
gaaggagagg acaagtgtct tgtctgtggc ttccaggaat gtgtggcaat ataagattta 1200
ctgttacagc agccaactca ccaagtcatt atttgactta ctgagttaag gaggaactaa 1260
gggtcatttt cccccatca tttgcatggt ttgactcctg aactgagggt ctacggccac 1320
tgaagctaga agctagaagg gtgttaatca gtagttagct ctacttactc catgtgtcac 1380
tgacagatgt aaaaaggaat atcaagtaat ctattattta aaaattgtaa taagagtgtt 1440
ttttgaagga attcaggaat gtactactaa cgagattatg atgcaggat atccatccat 1500
gaagcatttg ttagtccctt gaagcatcat ggtagtggaa tttaacatgg atcatctttg 1560
taaaccaccc tctcttttag ggccagagaa atcactgttt gttacaacaa gcaaaccctt 1620
ccctctccat gtcacccttg ccccaaacct gagaaacata tgggaacatg gcacagaggc 1680
tgagctctct gaagccagtt cctggctggg tttgctggcc agggagaggc aggtgtggtc 1740
agttgccctg tggacatgtg gtgtgcaggg agagaagagg gaaaagagcc actcaggctc 1800
tctggctgcc aggggatcca gactcttagc actagaactt ctgtttctta gaattcttcc 1860
caaggaaaag acaaaactgt gtttttataa gctgggttcc tatagtgtag atttgggact 1920
tttatacatt ttattaccaa atatttttag ttaagtgtct caattttcaa cattaattct 1980
ttaaaatttt cttttgagaa tcatcacctg gatttacatg aattttttta gcatgaaaaa 2040
atttaaacat attcaaaagt acatgaatag tacattgaag ccttatatac atatcaccca 2100
gatataaaaa ttaccaagat ttgtcccag ttgcttcatt tccctgttt ccttctttgc 2160
taaagtattt aaaagcaaat cccagatagc ttatcatctt acccctatat ccttcagtaa 2220
gtttctatgg aaaatatggc cattttcttg tataaaccac agtacctctg tttttttttt 2280
ttgagataga gtctcacact gtcgcccagg ctggagtgca atggcgtgat cttggctcac 2340
```

tgcaacctct	gcctcccagg	ttcaggcgat	tctcctgcct	cagccccccg	ggtagctggg	2400
attacagggtg	tgcgccacca	tgcccagcta	atTTTTTTTT	gtatcttcag	tagagatggg	2460
gtttcaccat	gttggccagg	ctggtctcga	gctcctgacc	tcgtgatcgc	ccgcttaggc	2520
ctcccaaagt	gctgggatta	taggcataag	ccacagcgcc	cggcccacag	taccattttt	2580
atacctaaca	aagtgattcc	ttggtacact	taatacctag	gcaaaatcaa	attgtcctga	2640
aggctcatgaa	tgtccttgga	cagtaatctg	gttctaatac	aggatctata	tgaagcccac	2700
caatcgcatc	tgggtgttgt	gtctcttttag	tctgtcagtc	tggagcaagc	tccccctcct	2760
tcctcagttc	cccatgttat	ttattttattg	taaaaactgg	gtcagttgtg	ctgtagaata	2820
ttctgctttc	tggatttggt	tgtttcttcc	tgtgggtgca	tttaacttgt	tttactatac	2880
cctaaacgga	accctttttcc	tctgttttca	gcagaagtct	gagaggctaa	acttgatggc	2940
tgtgttaaca	tatgtcacgt	gtagcacagt	ggagaaagca	ggatatggct	cataatgaca	3000
gtgggtgaaga	cctgcgaatg	aagttgctag	ttatcaccta	cattaggggt	tgacataggt	3060
ctatgtttatg	ggtcgctgca	tctgctggaa	ctcacagact	ttactataga	gaatcaaaga	3120
tcccgtatcc	gaagtctatg	gaaatgctca	tgggtggtaaa	ttccaacaga	atgaaacacc	3180
aaacttgctt	aaagtaactc	acgtttcaat	ttgaaagaga	tattgtcaaa	attggaggcc	3240
cccagggttcc	tgtctgttcc	aaatctttgc	atgatgacag	tggtttctct	gatgtggtaa	3300
gctttggctt	tcttctgttt	tctttctaaa	agatcactgg	agtagagagg	agttaaaccg	3360
acatgacctt	tgacctcttg	catgacctcc	acagatagca	aaccggggccg	acacatgggt	3420
gacgatgtcc	ttttctacaa	tgaagttaat	gaaagtctctg	aaaatagtga	ttactttctg	3480
acattgatag	gatttaggaa	acctctggat	aaatagctta	agcatggctg	tttatgtttt	3540
tgctatagac	aaaaagcagc	agcatgtaca	ttgtatttgg	acacaagcct	gcctcgggta	3600
atatattgaa	ctattggacc	actaggggta	gtagggagcg	gtctgtacac	tttctgattc	3660
agcattcaga	aacattctag	gtggactctg	tagctttcag	ttttgtaaa	ttatcagaaa	3720
aacatcgggg	gggtttggcc	atcatatgtg	agctttgtgt	ttcaatgcc	gttactcagg	3780
attagtaaat	taatgactgt	ccagaggact	tcagggtcac	caagctgctg	cacctgccat	3840
tggctgactc	tccccggcta	tctgtggctg	agatgggtgct	gcttaggtca	cgcagagcat	3900
gagctgctgc	tgaaggggca	caggagatgg	cccttgggct	tctcatccca	ggatgcctgc	3960
cctgcccacc	aatccatgag	aagatatgta	tgatttcagt	aggccctgga	tcagcttgct	4020
acctctgggt	tcctgtttgc	tttccactca	ctcagctgga	gtttcatttc	cagactaaag	4080
tcttcatcat	tggcttcaga	aacagcattc	atctgtggct	gtgctgatgt	agtacaccaa	4140
gaacaactgg	gctcttctct	gtcactttca	gtgggctacc	ttccctcacc	tctccaagca	4200
gcatgaaaga	attctttaca	tttttaactc	cttttttggt	tttccctgaa	agtatgcttt	4260
gggtgcttaa	gagagaagtc	acaaaagtat	actactgagt	ttcctggaga	tgaatcctg	4320
ttgtccctag	ctatgtgaat	gagcacaggg	atccctgatg	ccattatttt	gtatattcat	4380
acggcacaca	cttactgagg	gccttctgtg	tgccctaggg	gattgagcac	agtacatat	4440
cagggcaggt	agaaacagat	ggagagctga	tggcggtgtg	cttagagcag	ctgccccagg	4500
aggccctgtg	ggatggatgt	tgggcaggag	ccctgagacg	ttaggggcat	ataactaaag	4560
gacatagcag	gagttatagg	aggagctgat	ccctgaggga	aacaatgaag	acggagaaga	4620
tggggctaaa	gtttgaattg	tggggacatt	aatcacagtg	attcttaaaa	ctttgctgtt	4680
gatgatttta	aatggagaaa	atgagtacgt	aagatgttat	ttcccagttc	agtatattgg	4740
ttgccacaa	agtattttcc	taccatgaat	ggtcataat	acttgttgta	gaataccagg	4800
gacagcagag	atgggtgggt	agttacttcc	ttttcttaca	gcccagaagc	tttgggtgct	4860
aggagattga	ccaatttagc	cactgagcat	ttaatacaac	acagggctac	ccagatccca	4920
ctgtcctgat	ttgccctgaa	agccaaagga	gttaggagaa	ggtgagtggg	gagaatatat	4980
taatcctgag	agttgaacag	agcaaaaatc	cctattactt	ttgtacttaa	aacatctctg	5040
ccacatgtgc	tactctttta	tattctgttt	agggtggtta	tatgtgcaca	tcccatccta	5100
tgcctgcagt	tagccaaactc	agggtttata	ttgcctcctt	tctttttttt	tttttttttt	5160
tttttttaag	agatgggggtc	tcattctatc	atgcagactg	gagtgcagtg	gtgtgatcac	5220
agctcattgt	aacctccaac	gcctggacta	aagtgatcct	cctaccttgg	cctctctgggt	5280
agctgggact	acagggtgcat	gccaccacac	ccacctaat	ttttttattt	ttattttttg	5340
tagagacagt	ctcactatct	tgtcaggct	agtcctgaac	tcctgggctc	aagttatctt	5400
gctgcctcag	cctcccatgg	gtaattttta	tttccctttt	tttttttttt	ggagatggag	5460
tttcgctctt	gtcgcgccagg	ctggagtgca	atggcacgat	cttggctcac	tgcagtctcc	5520
acctcctggg	ttcaagtgat	tctccatcct	cagcctcctg	agtagctgag	attacaggca	5580
actgccacca	tgcgcggcta	atztatgtat	tttttttttag	taagagatgg	ggtttcacca	5640
tgttggccag	actagtctta	aactcctgac	ctcaagcgac	ctgcctgcct	tggcctccca	5700
aagtgtctggg	attacaggca	tgagccgcta	tgcctcgtcg	ctgattttta	tttcttattt	5760
tttttttaga	gatgggggtc	tcactatggt	gctcaggctg	atctcaaact	cctggcctca	5820

```

agtgatcctc ccaccttagc ctcccaagtt gctgggatta taagtgtgag ccactatccc 5880
tacctcacta ttaccttctt tgcttctctt gttttctttt gttctaagtc aaacccatca 5940
caatcttttc ttgtccttcc aggtgttttc cagtgtgttg ccctggatgt gctctctttc 6000
tcttagagcc cagagaactt gcttttcccc cttatatatg acccttaact ttttctaaca 6060
cattattaag ggcctgtgtc tatcagctgg gggcacttct tgaaggagg gcctttgtgt 6120
ggctctgttc tagtgacttc cagctttaac ccagagcctc atgattgctg ggtgcccata 6180
gcctttttgc tgaatggagg cactcagtct ccttgggaag agagaatcca tgatagacct 6240
acttgggagc tcccacttc aggggcctac acactggtaa tgcaacagaa tgcccaagag 6300
tgacctcata aagcaaggat tcccttcgtg gcccttctc tgctgcctct cagaatcc 6358

```

<210> 6

<211> 78

<212> DNA

<213> Homo sapiens

<400> 6

```

agacgctaag gaaaatccct aagcagagat tttctgttgg atgctaaaag caaggaataa 60
aagttgaaaa tttggaaa 78

```

<210> 7

<211> 72

<212> DNA

<213> Homo sapiens

<400> 7

```

ctgggcatgg ggcacccatg tgccgagagc cttgcagacc atgacaggtc cctattaaac 60
acaggctttc tg 72

```